U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON
2011

Benefits of Electric Vehicles: A National Perspective

Charging into the Future !

www.evadc.org

Electric Vehicle Assoc of DC

Electric Vehicles are Beneficial to our Nation

- a. Environmental Benefits - with and without renewable energy sources of electricity
- b. National Security - Decrease our Addiction to Oil – avoid dependence on unstable Middle East countries. Improves the reliability of the Smart Grid. Vehicle to Grid advantages.
- c. Economic Benefits - Trade Balance improved as we reduce imports generally, and cost savings to individuals with 75 cents/gallon equivalent cost for electricity, and lower maintenance costs.

Electric Vehicles are becoming more available.

- a. Review of Chevy Volt and plug-in hybrid electric vehicles versus Nissan LEAF and other all-electric, no gasoline EVs.
- b. Review of other manufacturers,
  Ford, Toyota, Smart, Think, BYD,
- c. Relative performance and costs of these vehicles.
  When will more come to market.
- d. President Obama's One Million EVs by 2015 goal.
  Manufacturers response.

Why Use Electricity to Power a Vehicle?

- Power Generation is dirty and thus EV's must be dirty, is a misconception !

- Gasoline is a waste of electricity.

- Hydrogen is a waste of electricity.

Where is the Electricity coming from?

43.5%	Coal
22.2%	Natural Gas
19.1%	Nuclear
8.9%	Hydroelectric
5.4%	Solar,Wind,Geo
0.7%	Petroleum

Coal Power is Cleaner than Gasoline!

- Vehicles pollute more over time while power plants tend to pollute less over time.
  - Cleaner regulations and more “Green Power” are coming online over time.

- Over the course of its lifetime, a gasoline car will spew out:
  - 60 times more Carbon Monoxide (CO)
  - 30 times more Volatile organic compounds (VOC)
  - Twice as much Carbon Dioxide (CO^2) as an coal power plant.

Gasoline is a waste of electricity

- Oil refineries are the largest consumers of electricity in the U.S. 48,891,000,000 kWh or 7.5% of all electricity used.

- **7.5 Kilowatt/Hours to produce 1 gallon of gasoline.**
  - The same 7.5KW/hrs could be put straight into the 24KW/hr battery back of a Nissan Leaf and power the car for 30 miles!!!!
  - SKIP THE GASOLINE

Hydrogen is a waste of electricity

- Most hydrogen is produced by using electrolysis to break down water into Hydrogen and Oxygen.

- It takes 4 electrons to produce 2 hydrogen atoms!!!!
  - 50% efficiency, lets just put all 4 electrons in an EV battery pack.

- SKIP THE HYDROGEN

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The truth is:

Most EV purchasers buy an EV because they want to reduce fossil fuel dependency and so many either install Solar or Wind, or they sign up for Clean Currents or other zero fossil fuel electricity source.

RESULT for EVs is:

33% Solar, Wind, Geo

EV incentives

- a. Federal and local tax credits for purchase.
- b. HOV lane and other incentives.
- c. Prime parking spaces?
- d. Incentives for charging stations.

- Just being good for You and the Planet

Charging at Home

- 67% of all Americans live in single family homes
- That's 205 million potential chargers.

Level-1 8 hr charge
(overnight and at work)

$300 cord - Outlet exists

Level-2
2 hr
charge

$3000 installed

Charging at Work

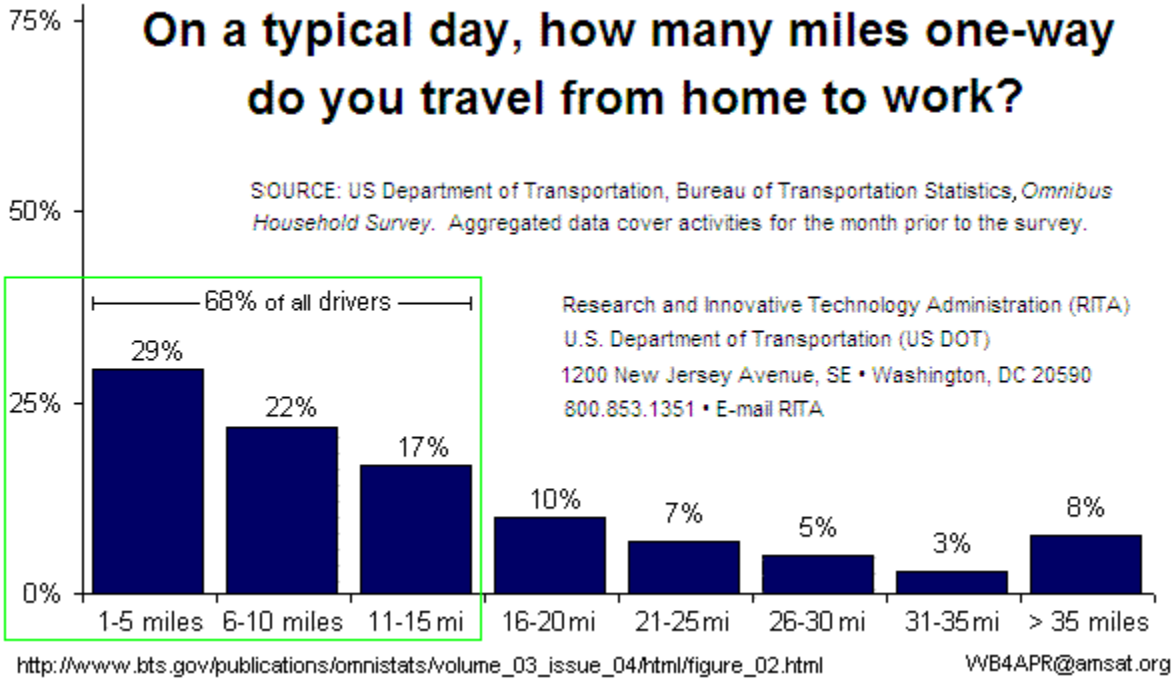
- Level-2 charges 20 mile trip in 2 hours.
- Level-1 charges 20 mile trip in 8 hours.

L2

L1

Charging at Work:

- Employees cars sit for 8 hours. Why not charge?
- 75% of all commuters drive to work less than 20 mi



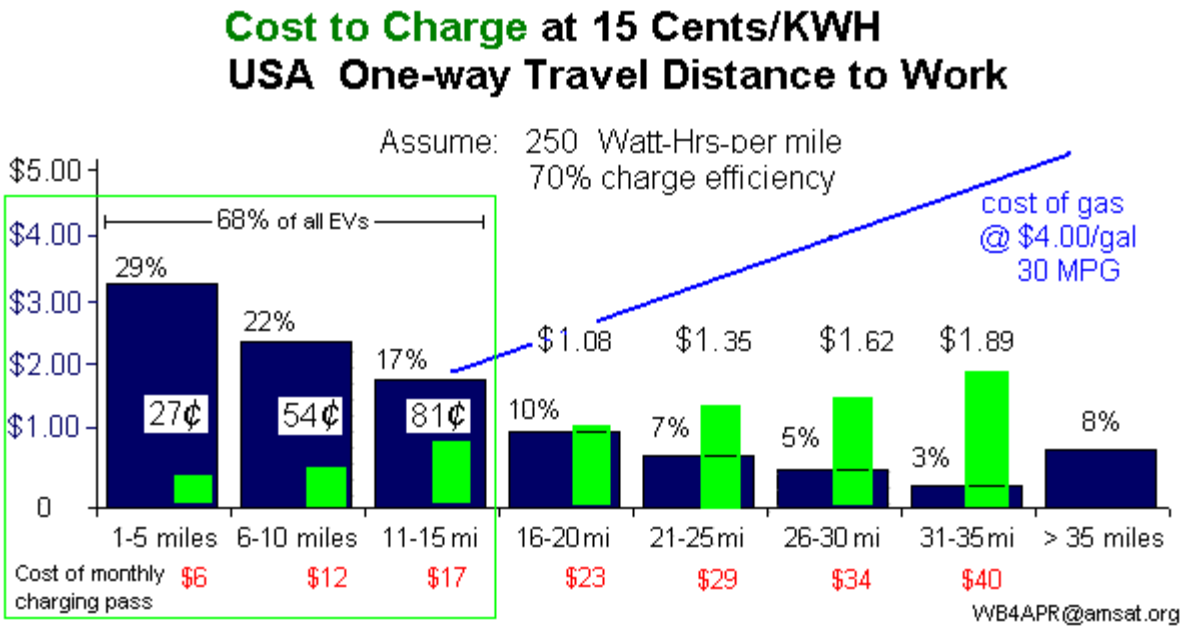
Charging at Work

- Many outlets already exist
- Just give us permission to

Payin-to-Plugin

Charging at Work:

- Employees cars sit for 8 hours. Why not charge?
- 75% of all commuters (<20 mi) could charge for <$1

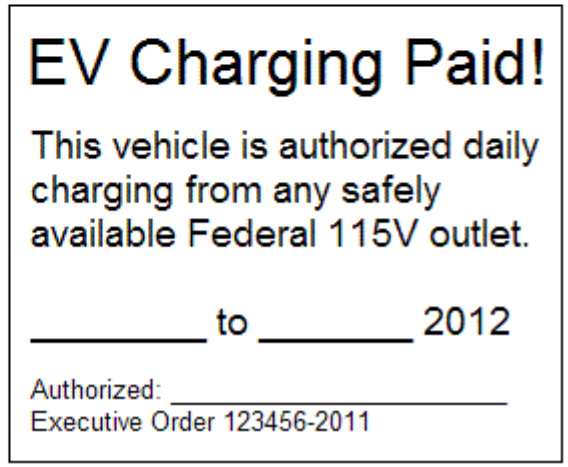


Charging at work: Payin-to-Plugin

Click to add chart

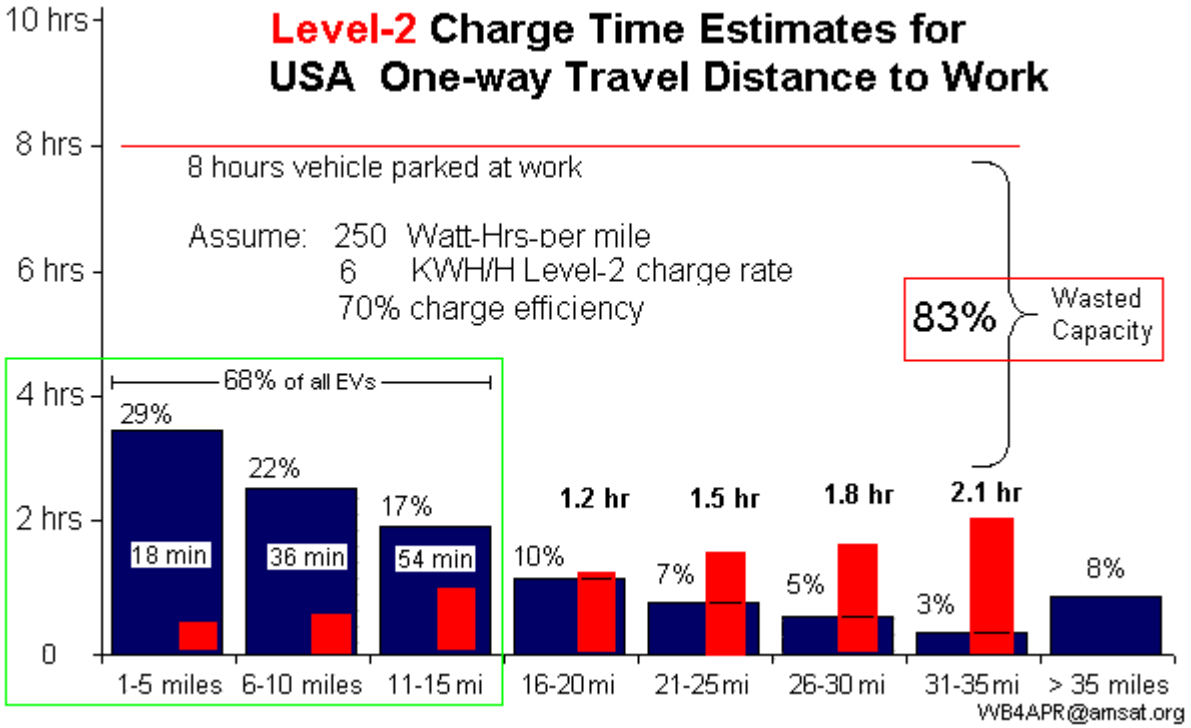
Until a formalized placard system is in place, local copier forms may be issued by local Pass-and-Tag offices (shown below).

$10/mo

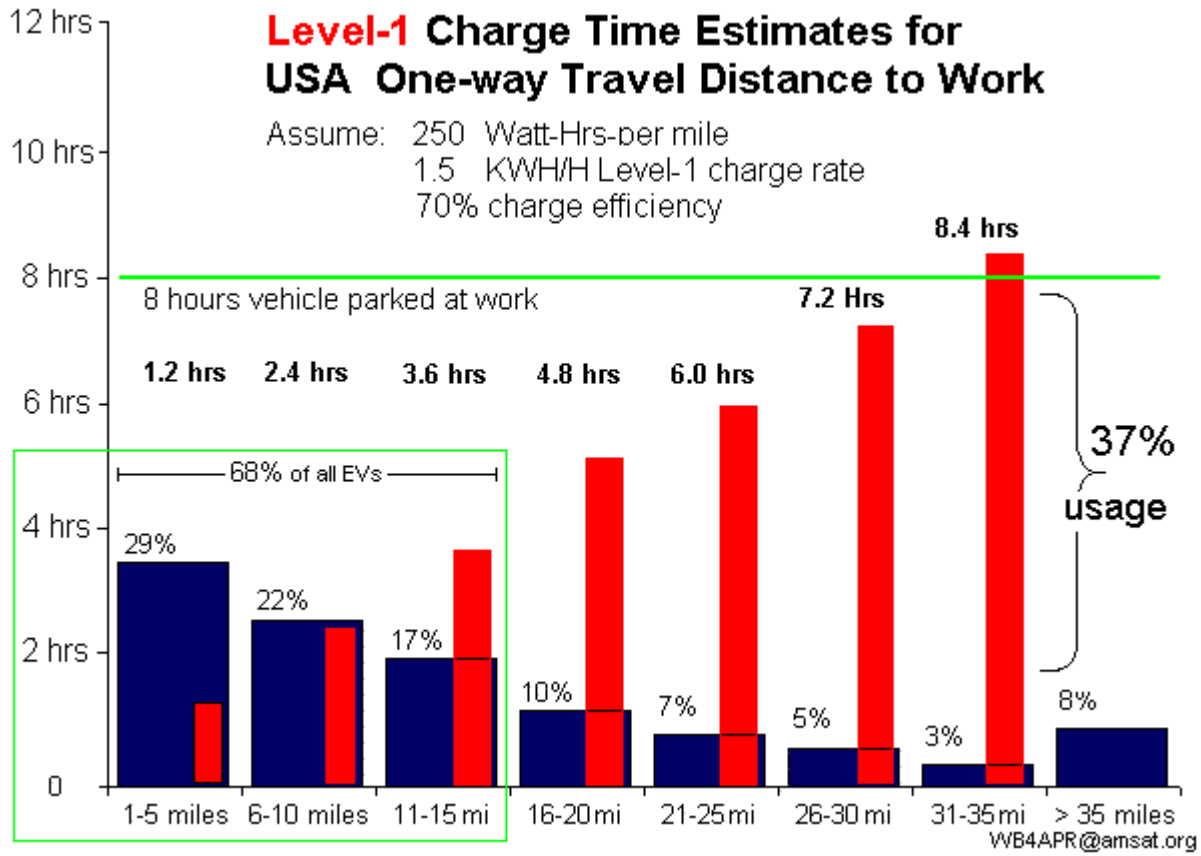


Charging at Work:

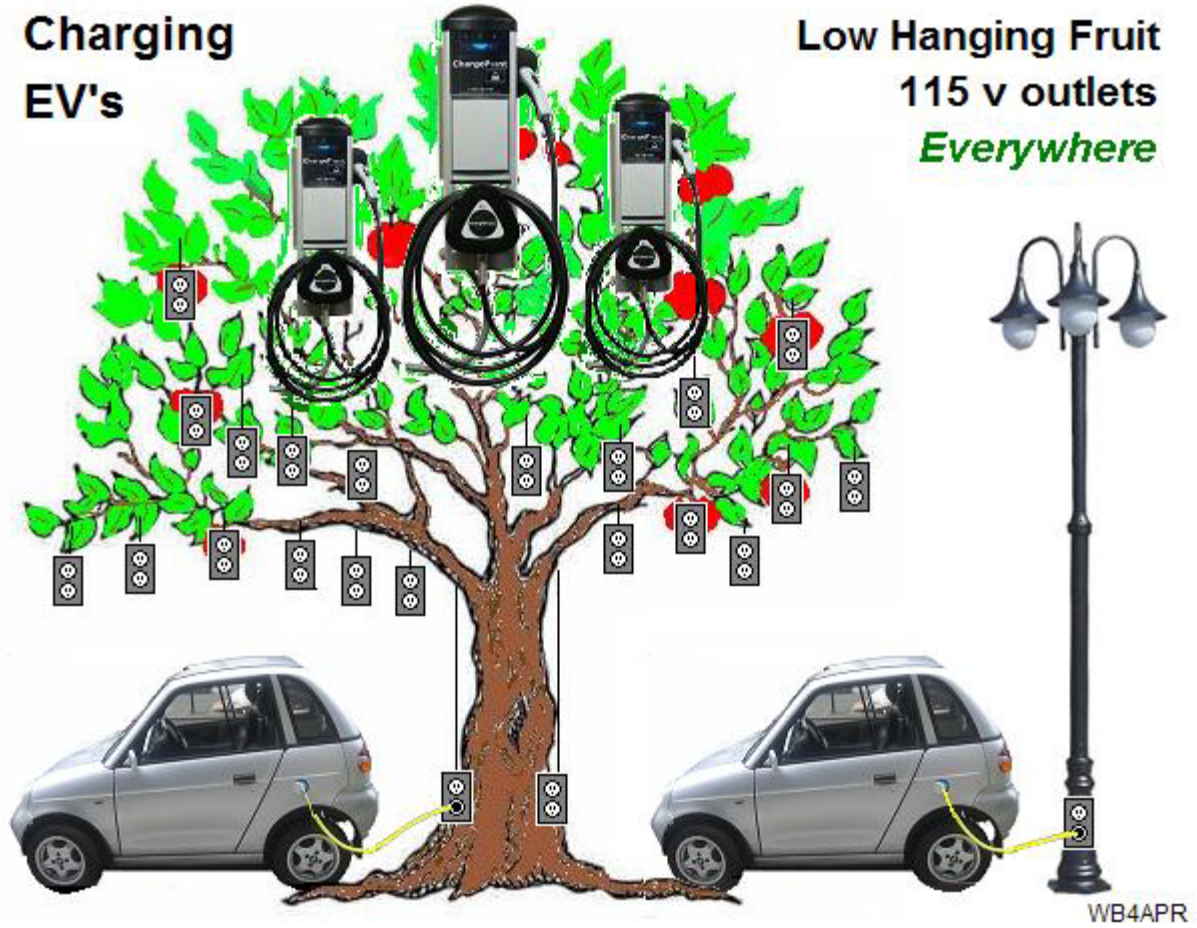
- 75% of all commuters (<20 mi) could charge for <$1
- But using expensive Level-2 chargers means the charger is idle 83%



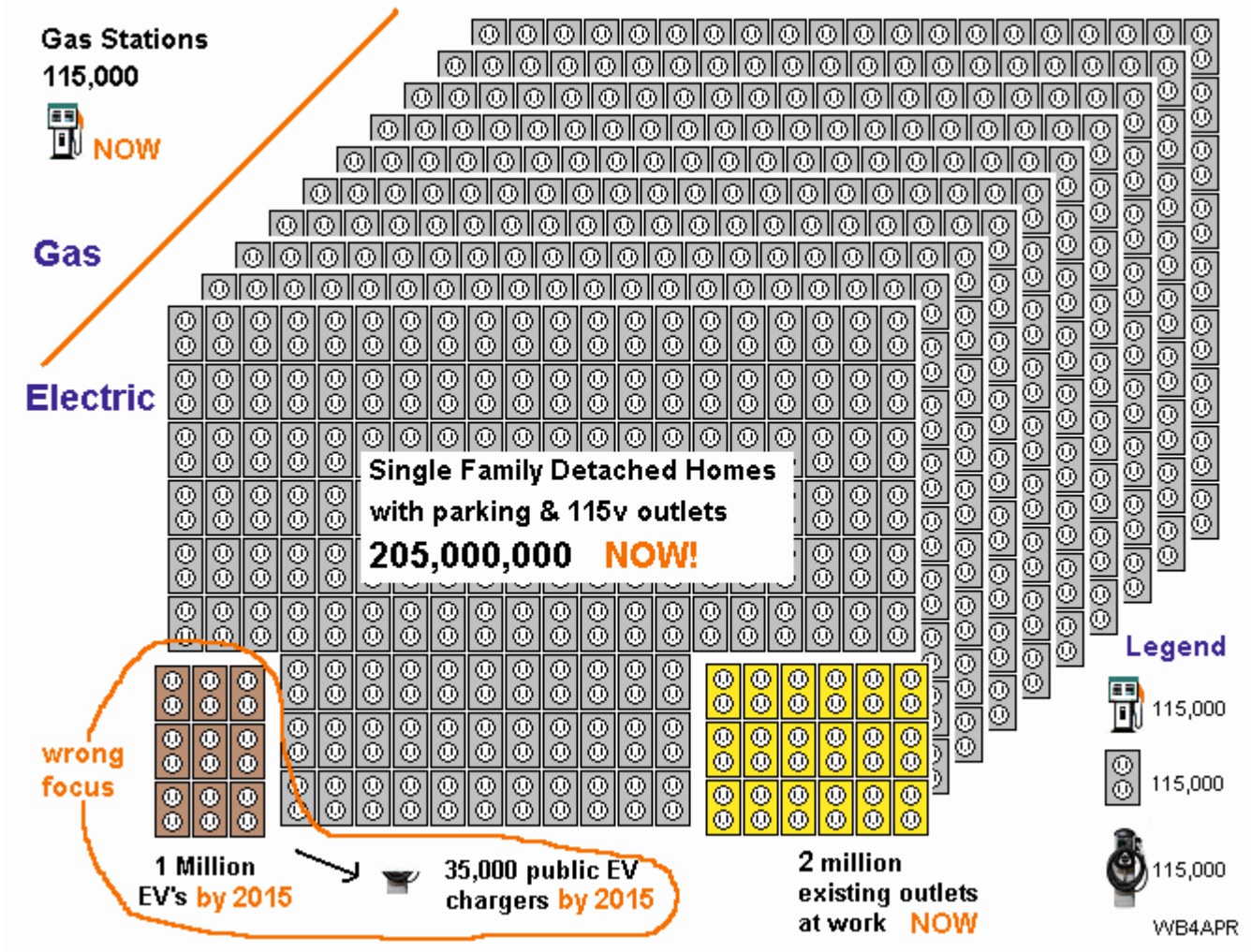
Level-1 chargers can fully charge 92% of all commuters in 8 hours



Level-1 chargers can fully charge 92% of all commuters and in most cases the 115v outlets already exist!



There are hundreds of millions of 115v Level-1 outlets!



L1 chargers can charge 92% of commuters and 115v outlets exist!

Other reasons that L1 charging should not be overlooked:

Five of the ideas for good battery life benefit by L1 charging:

1.* Avoid full charging when you can.

2.* Avoid deep discharging your battery pack.

4.* Minimize the time spent at a high state of charge.

6.* … plug in whenever you can.

8.* To maximize battery life, minimize use of DC quick charge.

EV promotion.

- a. Drag Races locally and around the country.
- b. On road races, like the Baltimore Gran Prix.
- c. Youth participation in EV challenges.
- d. Solar Taxi, Zero Emissions Race, WAVE sponsored by theSwiss, tours around the country to demonstrate EVs. FunRunintheSun.org

Come Join EVADC.ORG